END TO END LINKAGE STRUCTURE FOR INTEGRATED IMPACT ASSESSMENT OF INFRASTRUCTURE NETWORKS UNDER NATURAL HAZARDS

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MOTIVATION

This project is FP6 QuakeCoRE funded project with an aim to develop a linkage structure framework to link various models necessary for the estimation of geospatial hazard intensities, infrastructure component performance, network performance, interdependencies, and socio-economic metrics by achieving the following research objectives:

(i) inflow and outflow parameters between various models used within 'end to end' impact assessment of infrastructure networks;
(ii) characteristics of exogenous (independent) parameters into each model and the commonality and their consistency;
(iii) characteristics of the structure, metadata and software platforms used in each model

DESCRIPTION

Figure 1 provides a schematic representation of the basic interaction and high-level representation of the inflows and outflows between each model. The workflow moves from hazard into infrastructure component models and splits into two paths. First outflow characterising component performance goes into MERIT. Another outflow goes into the network models individually or through the interdependencies model if component interdependencies are identified. In each of the cases, the network metrics are generated which can be utilized by economic assessment tools like MERIT.

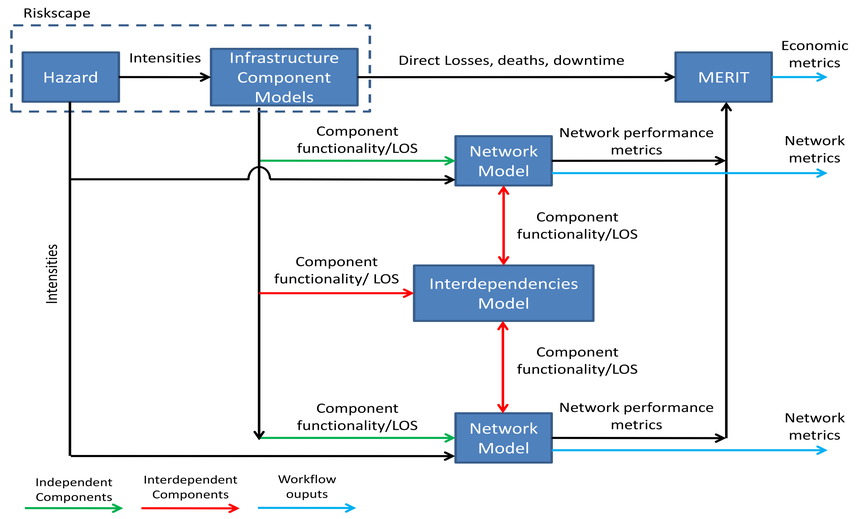

Figure 1. Schematic of module interaction and representative inflows and outflow.

UNDERSTANDING OF INTERLINKAGES BETWEEN MODELS

To understand the inflow and outflow requirements of each model, the information gathering has been done by interacting with model developers to classify the structure, metadata and software platforms used around four main modules of Hazard, Fragility, Damage and Functionality as shown in figure 2. Within each of these modules, relevant questions have been designed to understand work scope and possibilities of any interlinkages between various infrastructure network models.

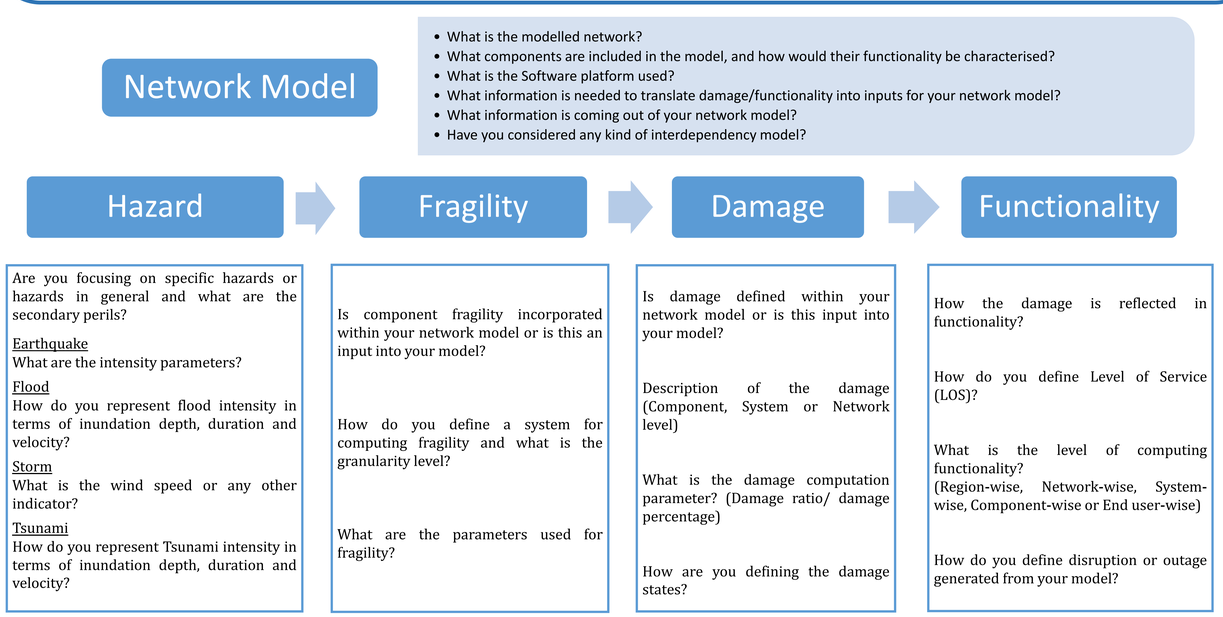

Figure 2. Schematic of basic modules for information gathering

LINKAGE FRAMEWORK

To understand the interlinkage possibilities between various infrastructure network models, a linkage framework has been designed as shown in figure 3. The initial linkage possibilities identified through interviews from different infrastructure network model developers have been added in the framework and with inclusion of more models, this framework would provide a platform for an integrated impact assessment of infrastructure networks under natural hazards.

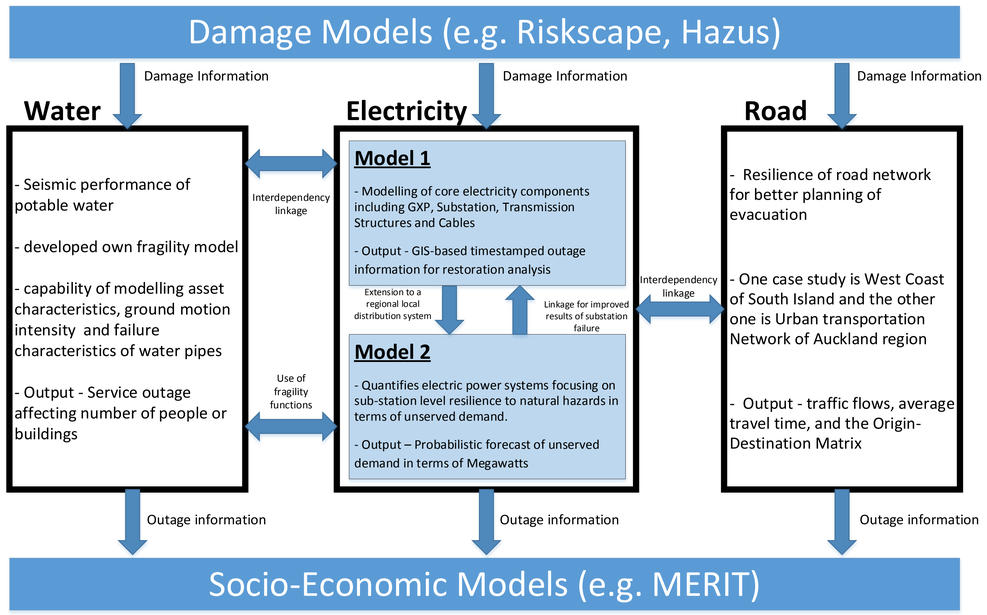

Figure 3. Framework for identification of interlinkages between different models

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